

WHAT IS CLAIMED IS:

1. A high-molecular flocculant having a molecular structure portion
comprised of an organic and/or inorganic amino compound added to at least a portion of
5 cyano groups contained in a high-molecular material.
2. The high-molecular flocculant as claimed in claim 1 wherein said inorganic
amino compound is at least one of ammonia, hydrazine and hydroxylamine.
3. The high-molecular flocculant as claimed in claim 1 wherein said inorganic
amino compound is at least one of a primary amine substituted by C1 to C12 hydrocarbon
10 group and a secondary amine substituted by C1 to C12 hydrocarbon group.
4. The high-molecular flocculant as claimed in claim 1 wherein said inorganic
amino compound is a polyamine having two or more amino groups.
5. The high-molecular flocculant as claimed in claim 4 wherein the molecular
structure portion having the polyamine added thereto includes an imidazoline ring.
- 15 6. The high-molecular flocculant as claimed in claim 1 wherein at least a
portion of the molecular structure portion forms a salt with one of an inorganic acid, an
organic acid, a halogenated hydrocarbon and a sulfuric acid ester.
7. The high-molecular flocculant as claimed in claim 1 wherein at least a
portion of the molecular structure portion is further hydrolysed.
- 20 8. The high-molecular flocculant as claimed in claim 1 wherein said
high-molecular material contains acrylonitrile as a monomer unit.
9. The high-molecular flocculant as claimed in claim 8 wherein said
high-molecular material is at least one selected from the group of acrylic fibers, nitrite
resin, styrene-acrylonitrile resin, acrylonitrile-butadiene- styrene resin, acrylonitrile-

styrene- acrylic resin, acrylonitrile- chlorinated polyethylene- styrene resin, nitrite rubber and acrylonitrile- butadiene rubber.

10. The high-molecular flocculant as claimed in claim 1 wherein said high-molecular material contains not less than 15 mol% of the total monomer units.

5 11. The high-molecular flocculant as claimed in claim 1 wherein said high-molecular material is contained in a waste material used up for other purposes.

12. A method for producing a high-molecular flocculant comprising: reacting a high-molecular material containing a cyano group with an inorganic and/or organic amino compound; and introducing a molecular structure portion having said amino
10 compound added to at least a portion of the cyano group.

13. The method for producing a high-molecular flocculant as claimed in claim 12 wherein at least one selected from the group of ammonia, hydrazine and hydroxylamine is used as said amino compound.

14. The method for producing a high-molecular flocculant as claimed in claim
15 13 wherein an organic amino compound is used as said amino compound and wherein an imidazoline ring is formed as said molecular structure portion.

15. The method for producing a high-molecular flocculant as claimed in claim 12 wherein one of an inorganic acid, an organic acid and a halogenated hydrocarbon is acted on said molecular structure portion for converting at least a portion of the molecular
20 structure portion into a salt.

16. The high-molecular flocculant as claimed in claim 12 wherein at least a portion of the molecular structure portion is further hydrolysed.

17. The high-molecular flocculant as claimed in claim 12 wherein a high-molecular material containing acrylonitrile as a monomer unit is used as the high-molecular material.

18. The high-molecular flocculant as claimed in claim 17 wherein at least one selected from the group of acrylic fibers, nitrite resin, styrene- acrylonitrile resin, acrylonitrile- butadiene- styrene resin, acrylonitrile- styrene- acrylic resin, acrylonitrile- chlorinated polyethylene- styrene resin, nitrite rubber and acrylonitrile-butadiene rubber is used as said high-molecular material.

19. The high-molecular flocculant as claimed in claim 12 wherein a high-molecular material containing not less than 15 mol% of the total monomer units is used as said high-molecular material.

20. The high-molecular flocculant as claimed in claim 12 wherein a high-molecular material contained in a waste material used up for other purposes is used as said high-molecular material.

21. A method for water processing comprising: charging into water for processing a high-molecular flocculant having a molecular structure portion comprised of an inorganic and/or organic amine compound added to at least a portion of cyano groups contained in a high-molecular material.

22. The method for water processing as claimed in claim 21 wherein said high-molecular flocculant is used in conjunction with at least one of a nonionic high-molecular flocculant, an anionic high-molecular flocculant and a cationic high-molecular flocculant.

23. The method for water processing as claimed in claim 22 further comprising: sequentially charging said high-molecular flocculant and the anionic high-molecular flocculant into the water for processing.

24. A high-molecular flocculant in which at least a portion of cyano groups
5 contained in a high-molecular material has been converted into carbamoyl groups.

25. The high-molecular flocculant as claimed in claim 24 wherein a further portion of the carbamoyl groups is converted into carboxyl groups or salts thereof.

26. The high-molecular flocculant as claimed in claim 24 wherein said high-molecular material contains acrylonitrile as a monomer unit.

10 27. The high-molecular flocculant as claimed in claim 26 wherein said high-molecular material is at least one selected from the group of acrylic fibers, nitrite resin, styrene- acrylonitrile resin, acrylonitrile- butadiene- styrene resin, acrylonitrile- styrene- acrylic resin, acrylonitrile- chlorinated polyethylene- styrene resin, nitrite rubber and acrylonitrile- butadiene rubber.

15 28. The high-molecular flocculant as claimed in claim 24 wherein said high-molecular material contains not less than 15 mol% of the total monomer units.

29. The high-molecular flocculant as claimed in claim 24 wherein said high-molecular material is contained in a waste material used up for other purposes.

20 30. A method for producing a high-molecular flocculant comprising: hydrolysing a high-molecular material containing cyano groups to convert at least a portion of the cyano groups into carbamoyl groups.

31. The method for producing a high-molecular flocculant as claimed in claim 30 wherein said hydrolysis is carried out in one step in the presence of an acidic catalyst.

32. The method for producing a high-molecular flocculant as claimed in claim 30 wherein said hydrolysis is carried out in two steps, namely a first step employing an acidic catalyst and a second step of employing a basic catalyst, and wherein, in said second step, a further portion of the carbamoyl groups is converted into carboxylic groups or salts thereof.

33. The high-molecular flocculant as claimed in claim 30 wherein a high-molecular material containing acrylonitrile as a monomer unit is used as the high-molecular material.

34. The high-molecular flocculant as claimed in claim 33 wherein at least one selected from the group of acrylic fibers, nitrile resin, styrene- acrylonitrile resin, acrylonitrile- butadiene- styrene resin, acrylonitrile- styrene- acrylic resin, acrylonitrile- chlorinated polyethylene- styrene resin, nitrite rubber and acrylonitrile butadiene rubber is used as said high-molecular material.

35. The high-molecular flocculant as claimed in claim 30 wherein a high-molecular material containing not less than 15 mol% of the total monomer units is used as said high-molecular material.

36. A method for processing water comprising: charging into water for processing a high-molecular flocculant comprised of a high-molecular material at least a portion of cyano groups of which has been converted into carbamoyl groups.

37. The method for water processing as claimed in claim 36 wherein said high-molecular flocculant is used in conjunction with at least one of a nonionic high-molecular flocculant, an anionic high-molecular flocculant and a cationic high-molecular flocculant.

38. The method for water processing as claimed in claim 37 further comprising: sequentially charging said high-molecular flocculant and the anionic high-molecular flocculant into the water for processing.

5 39. The method for water processing as claimed in claim 36 further comprising: charging into the water for processing the high-molecular flocculant a further portion of carbamoyl groups of which have been converted into carboxylic groups or salts thereof.